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Author(s)	Furukawa, Noriko
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Infestation and feeding biology of an invasive Lyctine beetle, *Lyctus africanus,* in Japan

(Laboratory of Innovative Humano-Habitability, RISH, Kyoto University)

Noriko Furukawa

In the postwar period, infestation by Lyctine beetles became a serious problem in Japan mainly because of the mass use of tropical broad-leaf timbers/plywood such as *Shorea* spp. for building materials, furniture and so on. The most important species has been recognized as *Lyctus brunneus*. Recently, it is widely believed that infestation by Lyctine beetles is increasing with generalization of the super-insulated houses in Japan. The transition of Lyctine species is also likely to be one of the major reasons for this. The purposes of this research are to know the present major Lyctine species in Japan, and to compare feeding biology of important Lyctine species.

Firstly, a questionnaire survey together with the insect sample collection was conducted to all members of the Japan Termite Control Association (approx. 900 companies), some house builders and production companies of wood-based materials. Then all collected Lyctine samples were identified by their morphological characteristics. Of total 51 samples, the majority (33 samples) was identified as an invasive species, *Lyctus africanus*. Thirteen samples were attributed to *L. brunneus*, followed by *Minthea rugicollis* (3 samples), *L. linearis* (one sample) and *Lyctoxylon dentatum* (one sample). From the survey, it was clearly demonstrated that *L. africanus* was the major pest species in Lyctine in Japan these days, and is mainly distributed from Kyusyu area to Tokai area.

Secondary, feeding biology of *L. africanus* and *L. brunneus* was comparatively studied by the three test.

a) In the feeding preference test, sapwoods samples of *Shorea* sp., *Hevea brasiliensis, Tectona grandis, Quercus serrata, Castanea crenata, Juglans* sp., *Betula maximowicziana* and *Fraxinus mandshurica were* exposed to adults of *L. africanus* and *L. brunneus* for six months under the conditions of 26 °C and 60%RH, and the numbers of emerged insects (2nd generation) were counted as well as the observation of the samples by the Soft X-ray apparatus. After six months, only sapwood samples of *H. brasiliensis* were attacked by the both beetles. No feeding tunnels were observed in other samples, showing that female adults did not lay eggs to these sapwood samples.
b) Artificial diets consisting of soluble starch, wood powder and beer yeast were exposed to the mixed same numbers of adult pairs of *L. africanus* and *L. brunneus* under the conditions of 26 °C and 60%RH, and numbers and dates of emerged insects (2nd generation) from the diets were recorded daily for three months. Adults of *L. africanus* emerged from the diets earlier than those of *L. brunneus*, and the total numbers of emerged insects were significantly higher in *L. africanus* than in *L. brunneus*.
c) Artificial diets were separately exposed to the same numbers of adult pairs of *L. africanus* and *L. brunneus* under the conditions of 24°C, 26 °C and 28°C at 60%RH, and numbers and dates of emerged insects (2nd generation) from the diets were recorded daily for three months. Same as in the mixed species test, adults of *L. africanus* emerged earlier than those of *L. brunneus* at any temperatures. Interestingly, the numbers of total emerged adults were increased with temperature in *L. africanus,* and on the contrary, they were decreased with temperature in *L. brunn*eus. This may show the different temperature preference of these two Lytine species, which has relationship with their distribution.

These results suggest that *L. africanus* must win the competition with *L. brunneus* in the near future in Japan, and that the standards and test methods, which have been developed against *L. brunneus*, have to be revised by considering feeding biology of *L. africanus*.

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